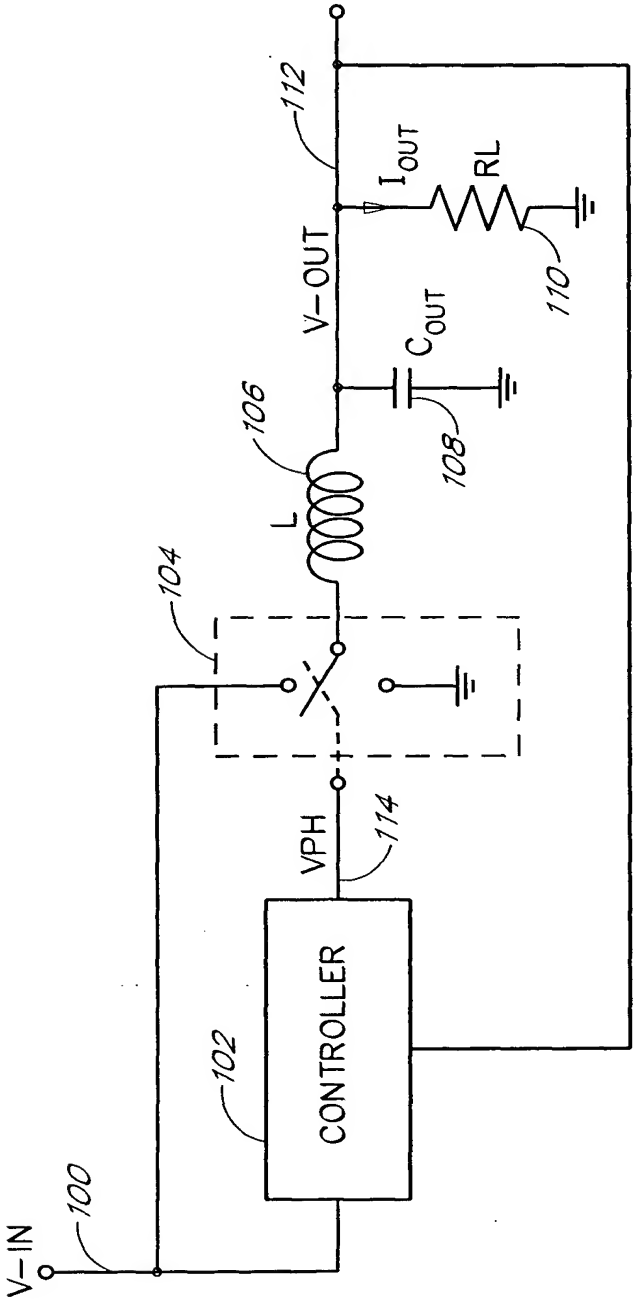

FIG. 1
(PRIOR ART)

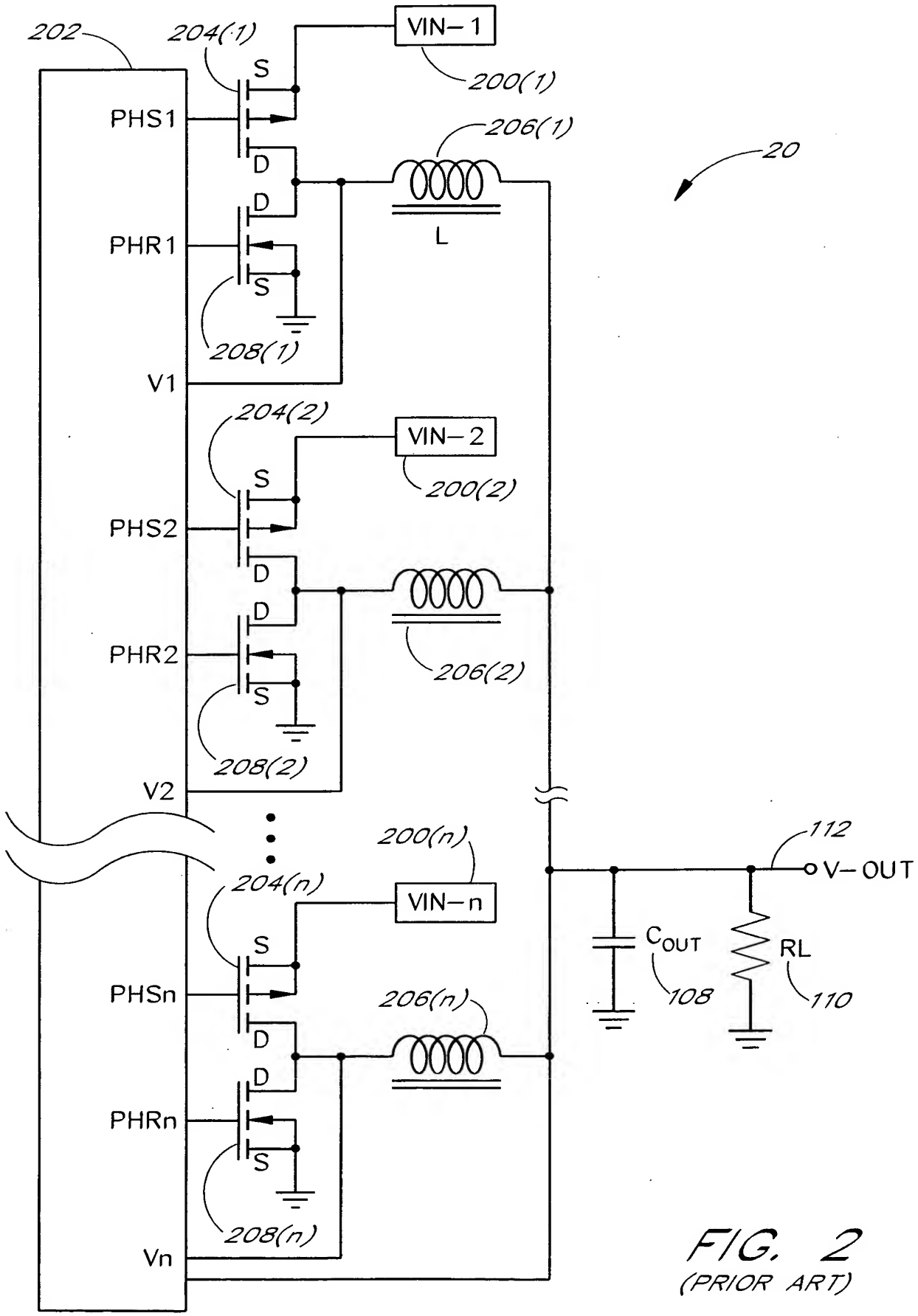

FIG. 2
(PRIOR ART)

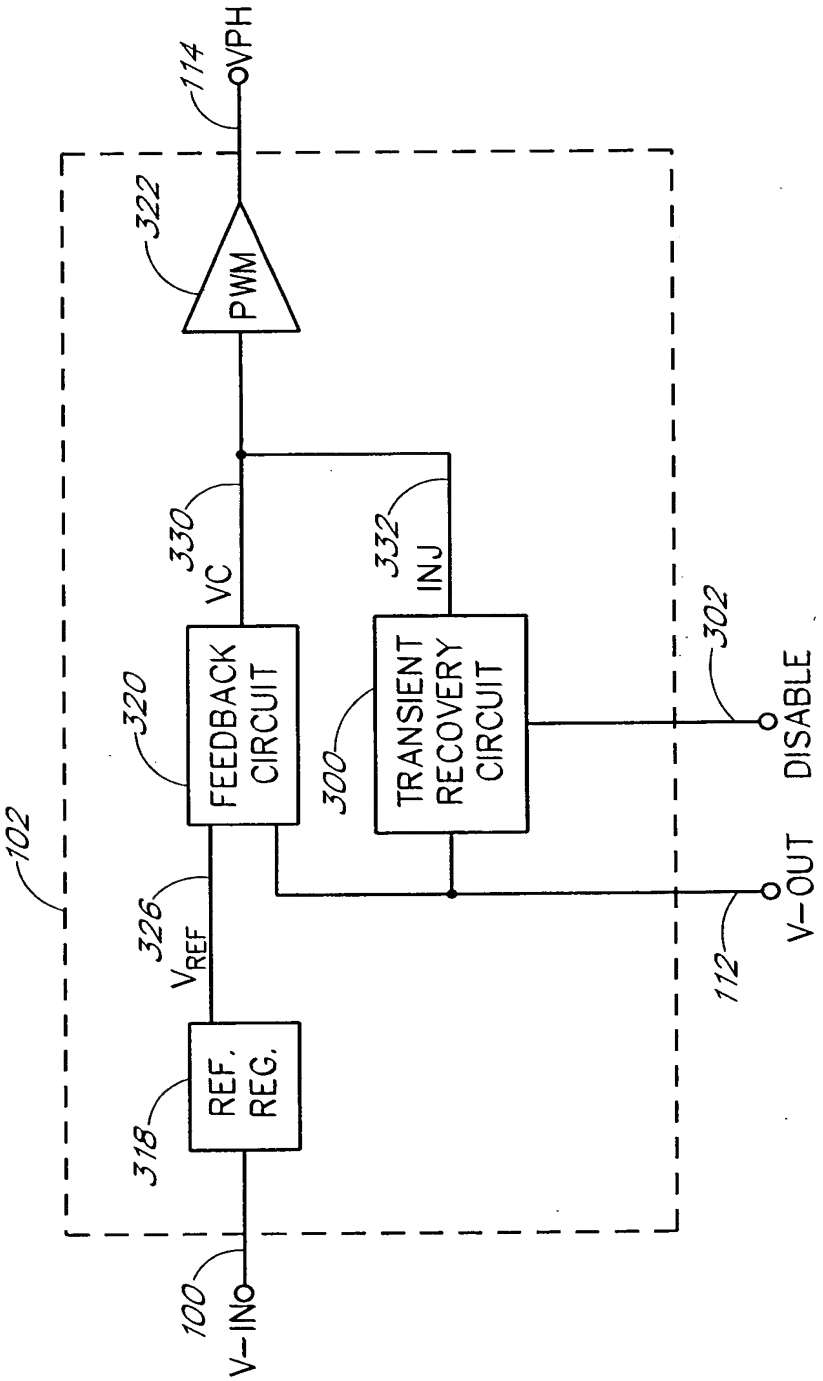
114
VPH
322
PWM
330
VC
332
INJ
320
FEEDBACK CIRCUIT
300
TRANSIENT RECOVERY CIRCUIT
302
DISABLE
102
326
V_{REF}
318
REF. REG.
100
V-IN
V-OUT
112

FIG. 3

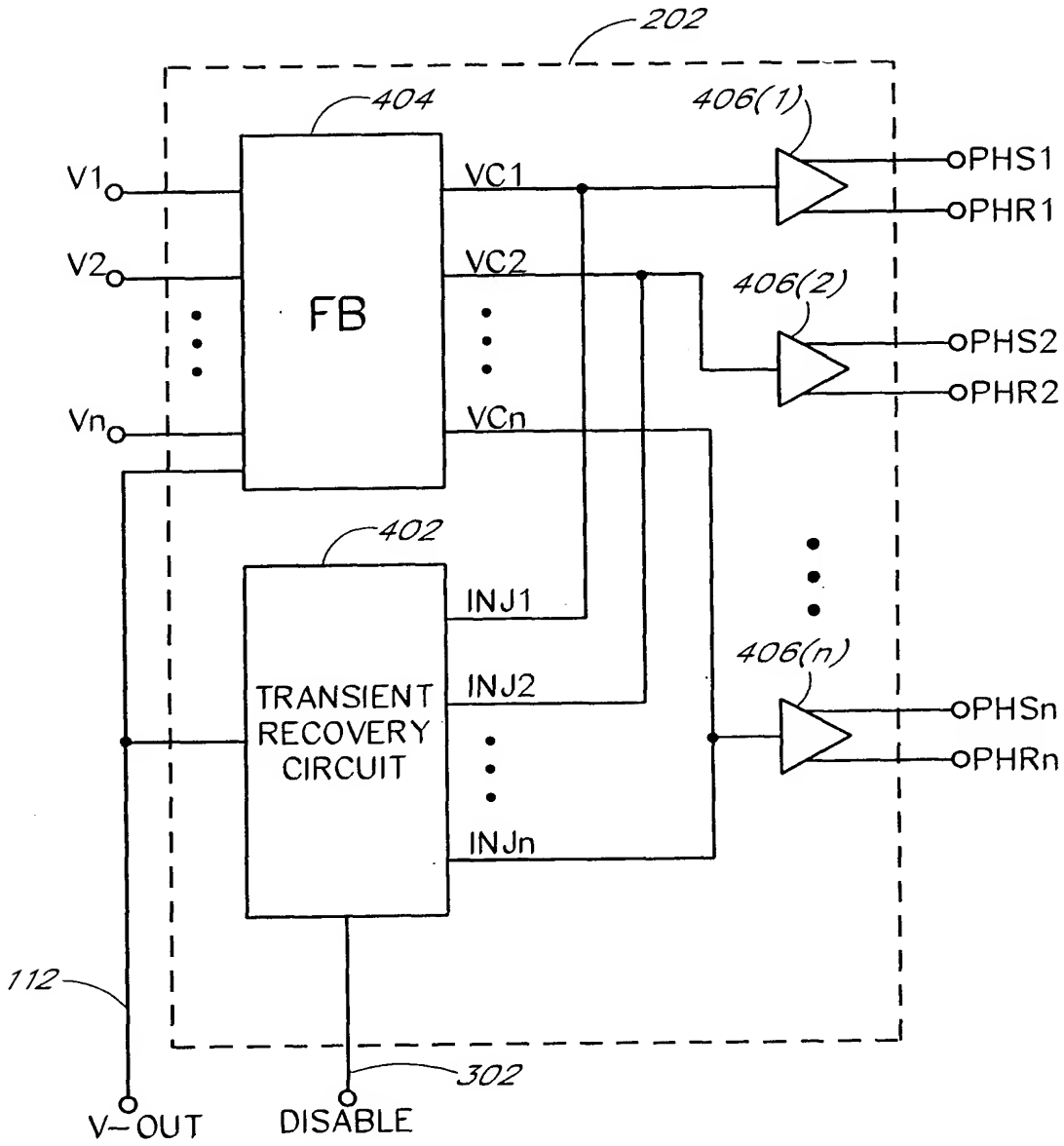
202
404
406(1)
V1
V2
Vn
FB
VC1
VC2
VCn
PHS1
PHR1
406(2)
PHS2
PHR2
402
INJ1
INJ2
INJn
TRANSIENT
RECOVERY
CIRCUIT
406(n)
PHSn
PHRn
112
302
V-OUT
DISABLE

FIG. 4

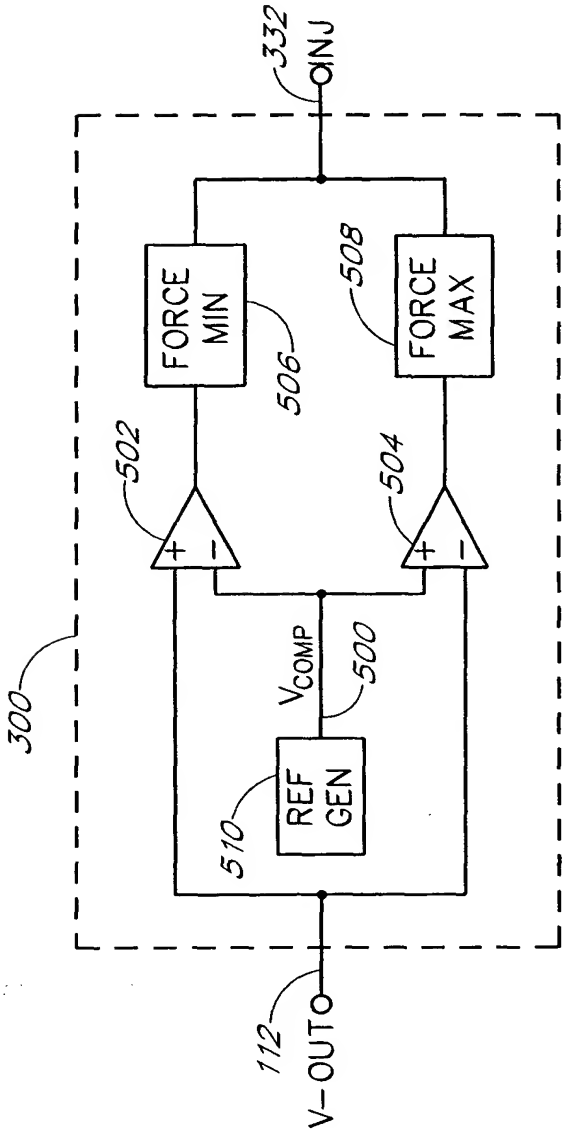
332
INJ
FORCE MIN
506
508
FORCE MAX
502
504
+
-
+
-
300
VCOMP
500
REF GEN
510
112
V-OUT

FIG. 5

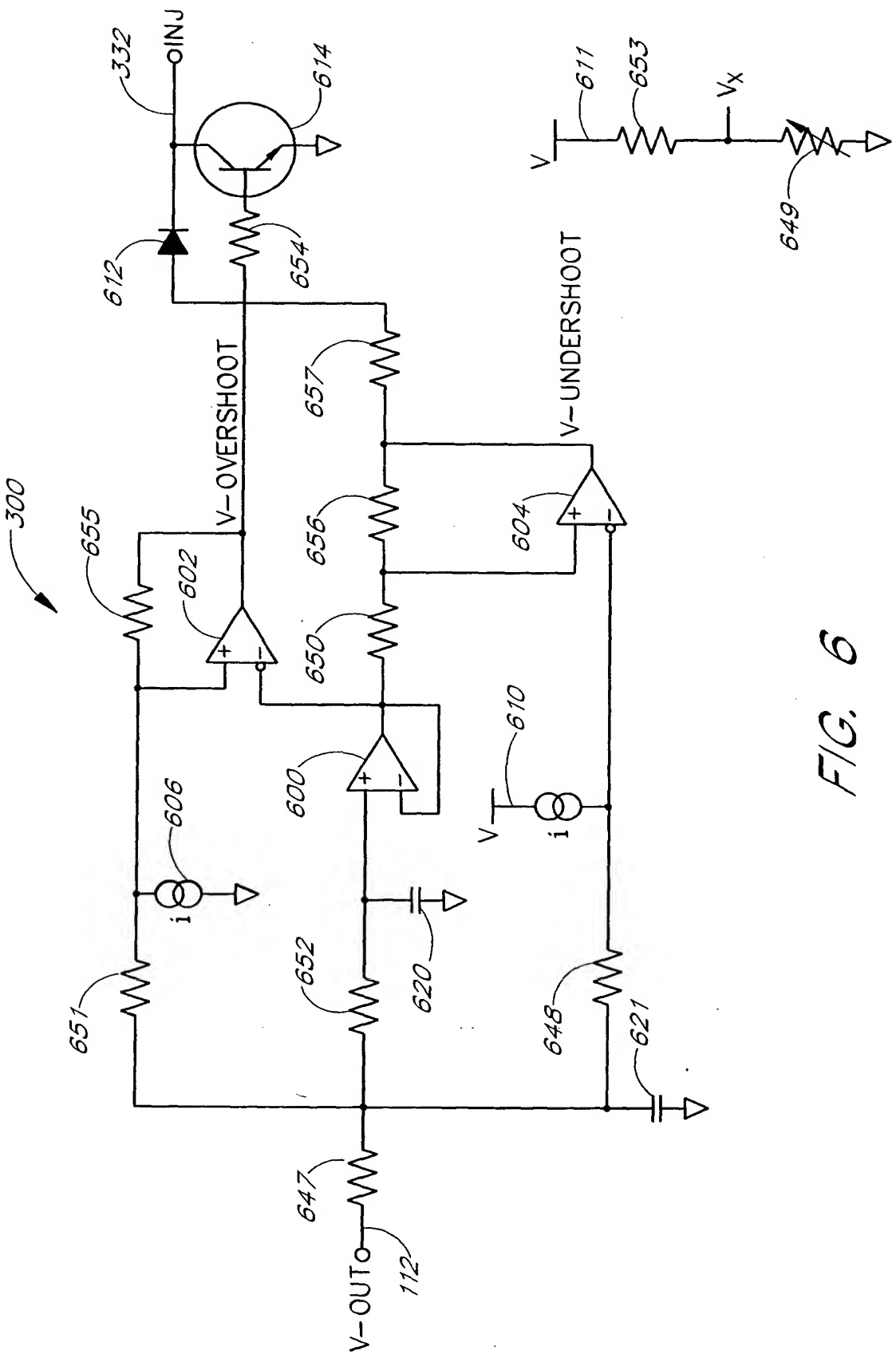
300
332
IINJ
614
612
654
657
V- OVERSHOOT
V- UNDERSHOOT
655
602
656
604
650
600
606
610
i
V
651
652
620
648
621
647
V- OUT
112
611
653
V_X
649

FIG. 6

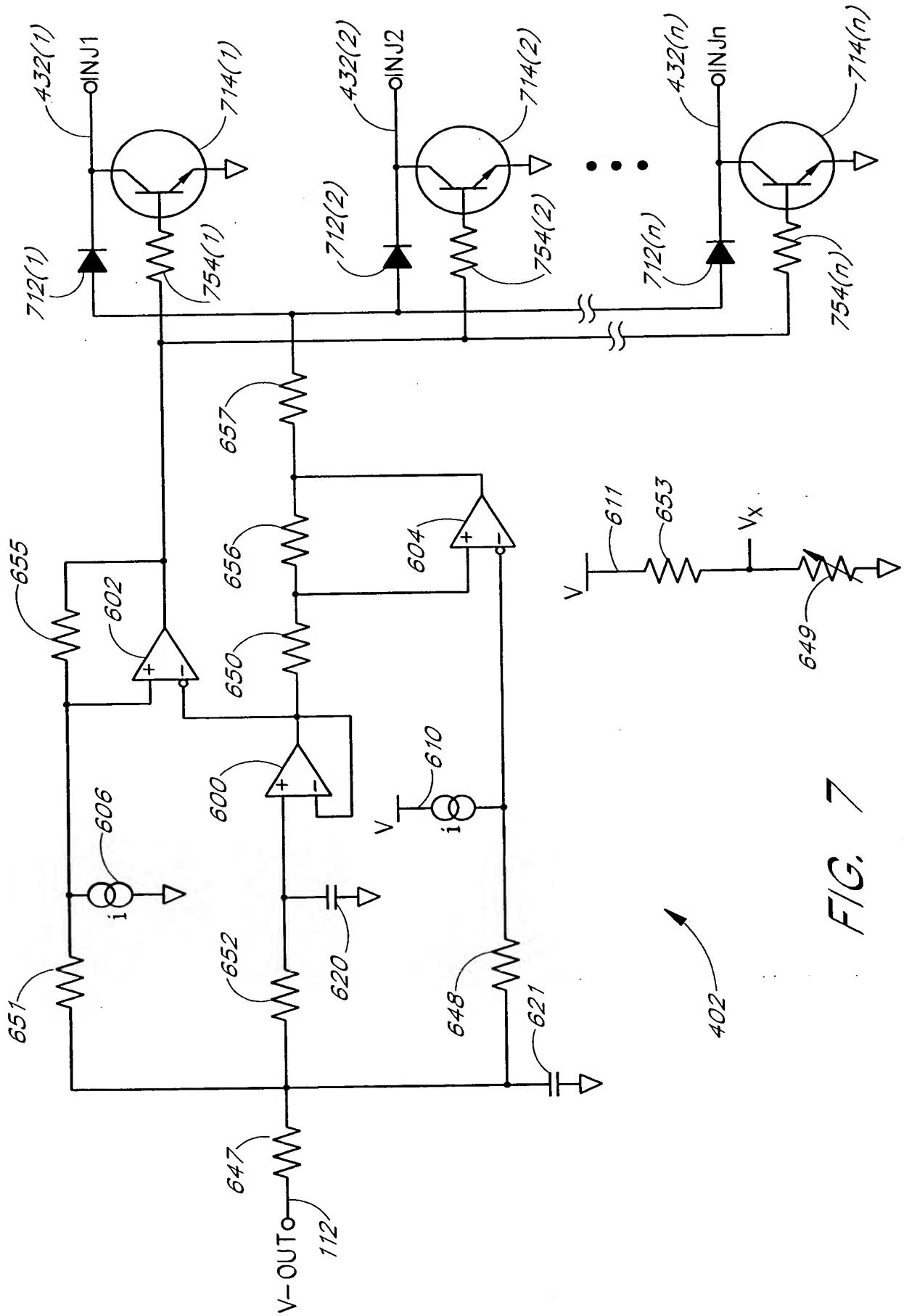
INJ1
INJ2
INJn
432(1)
432(2)
432(n)
714(1)
714(2)
714(n)
712(1)
712(2)
712(n)
754(1)
754(2)
754(n)
657
656
655
650
651
652
647
648
620
621
649
653
611
600
602
604
606
610
V
i
V-OUT
112
402

FIG. 7

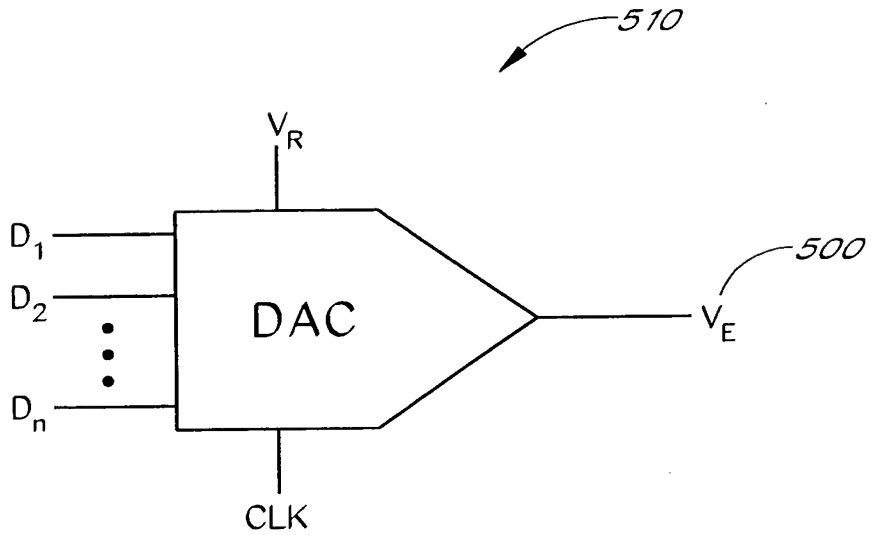

FIG. 8

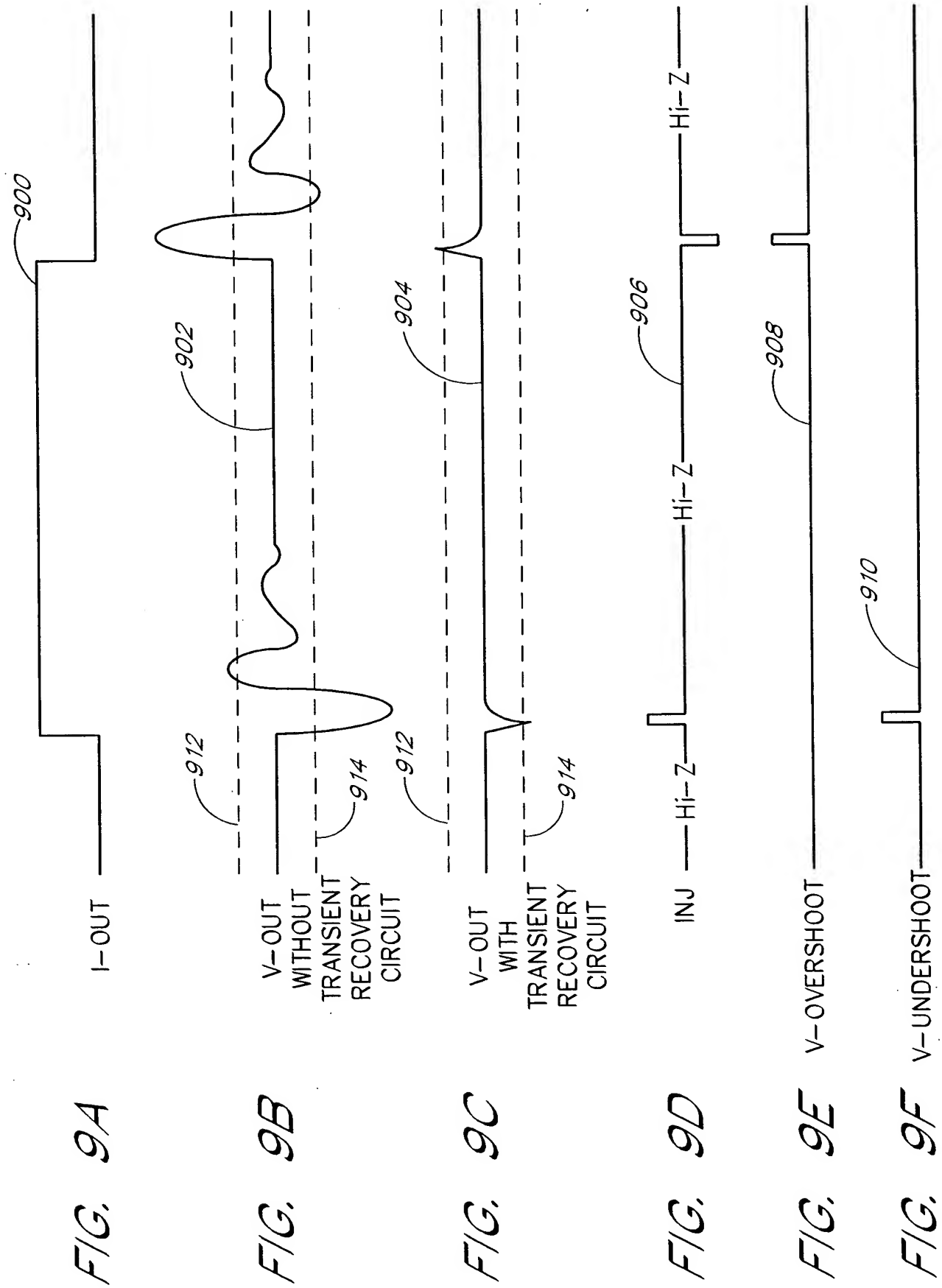

FIG. 9A

FIG. 9B

FIG. 9C

FIG. 9D

FIG. 9E

FIG. 9F

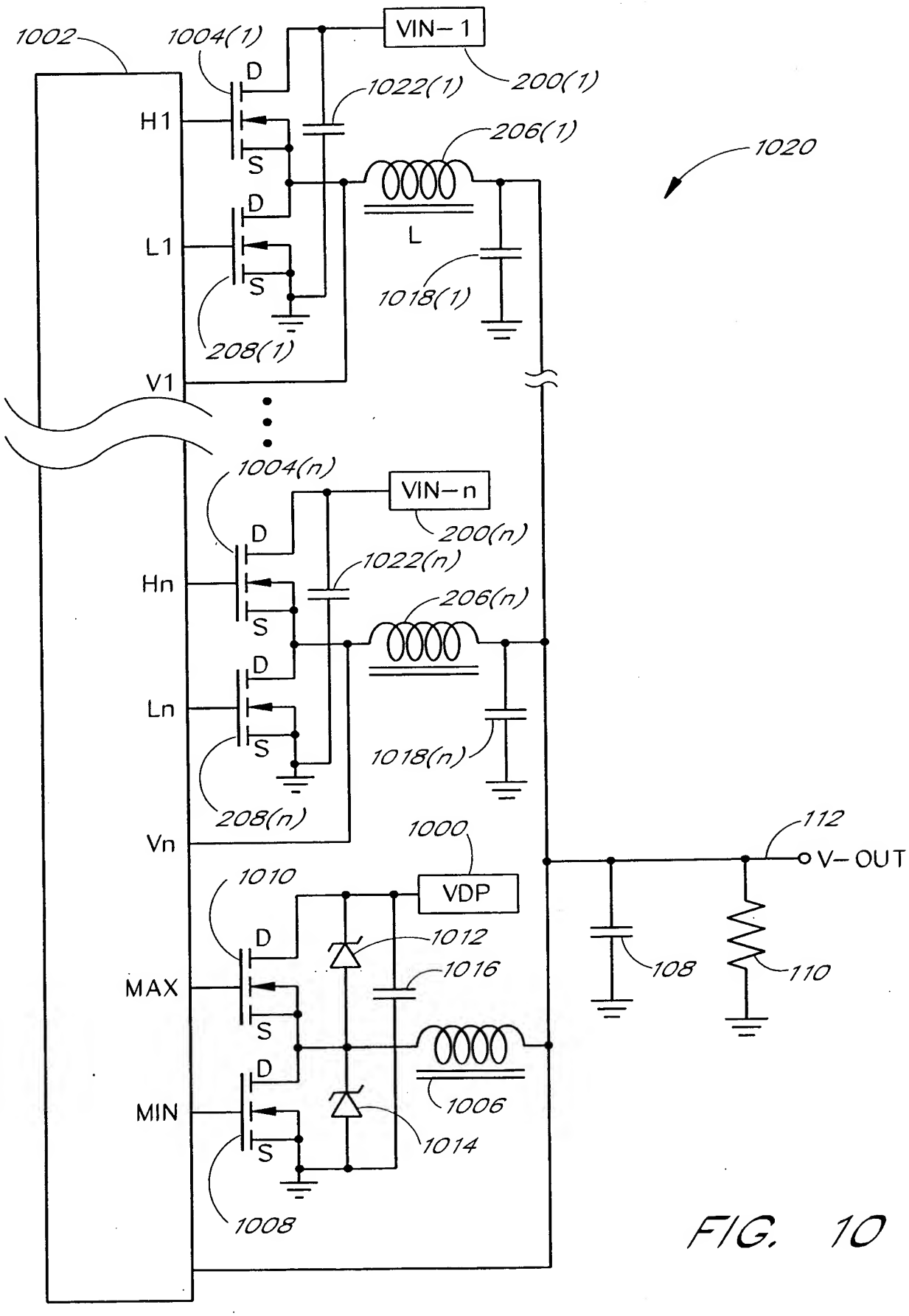
1002
1004(1)
VIN–1
200(1)
1022(1)
206(1)
1020
H1
D
S
L1
L
1018(1)
208(1)
V1
1004(n)
VIN–n
200(n)
1022(n)
206(n)
Hn
Ln
1018(n)
208(n)
Vn
1000
112
V– OUT
1010
VDP
1012
1016
MAX
MIN
108
110
1006
1014
1008

FIG. 10

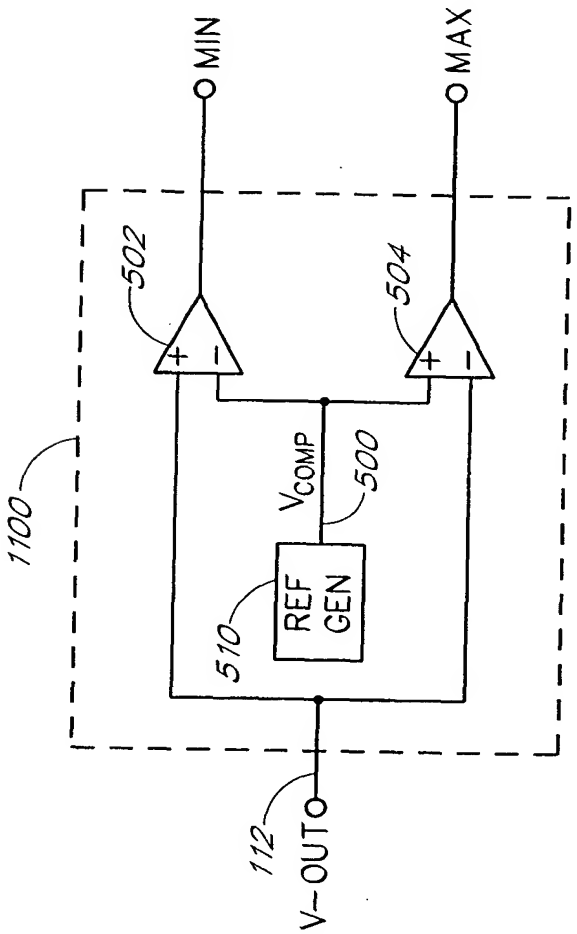

FIG. 11

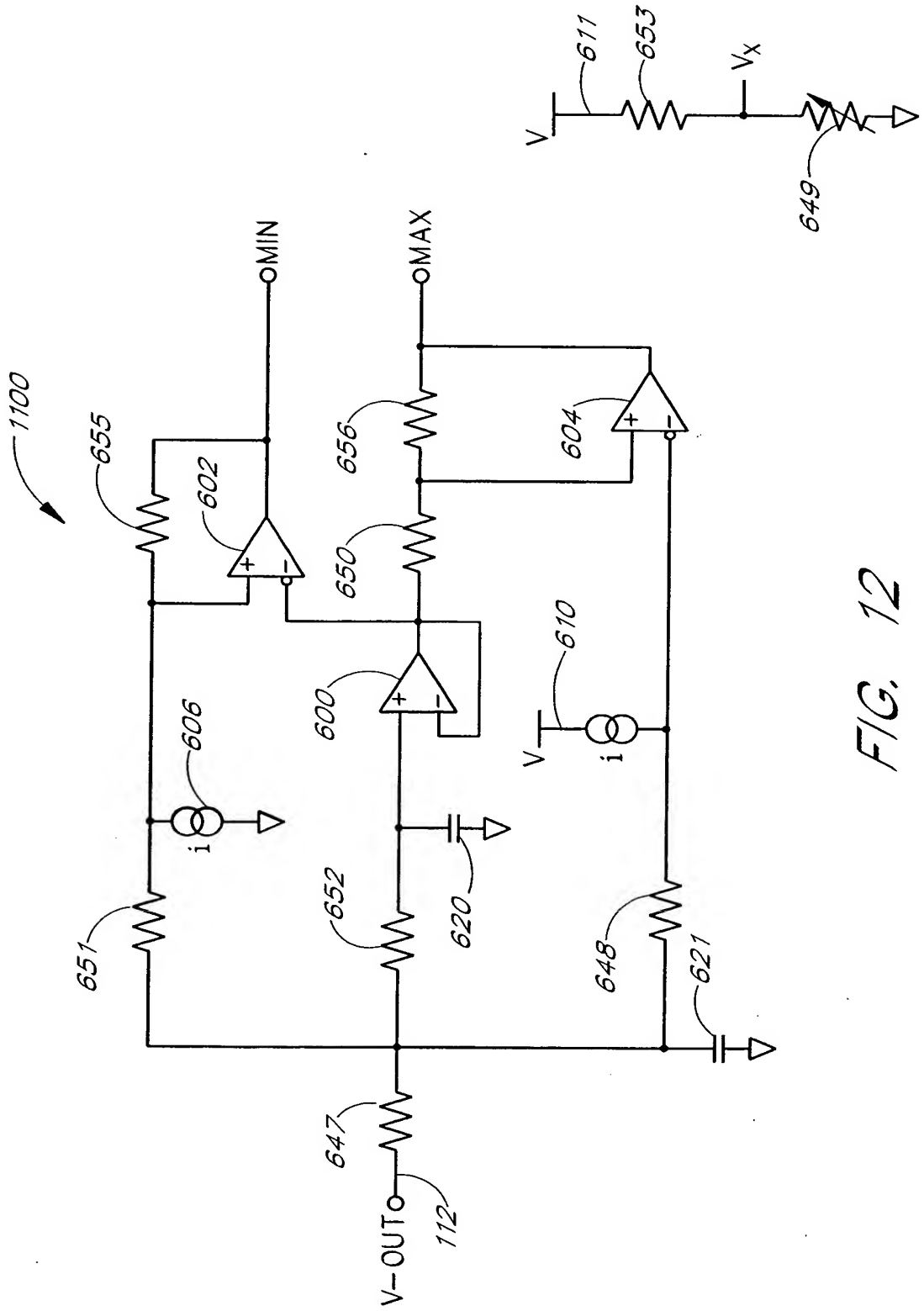
1100
MIN
MAX
655
602
656
604
650
600
606
610
651
652
620
648
621
647
649
611
653
V_X
V
i
V– OUT
112

FIG. 12

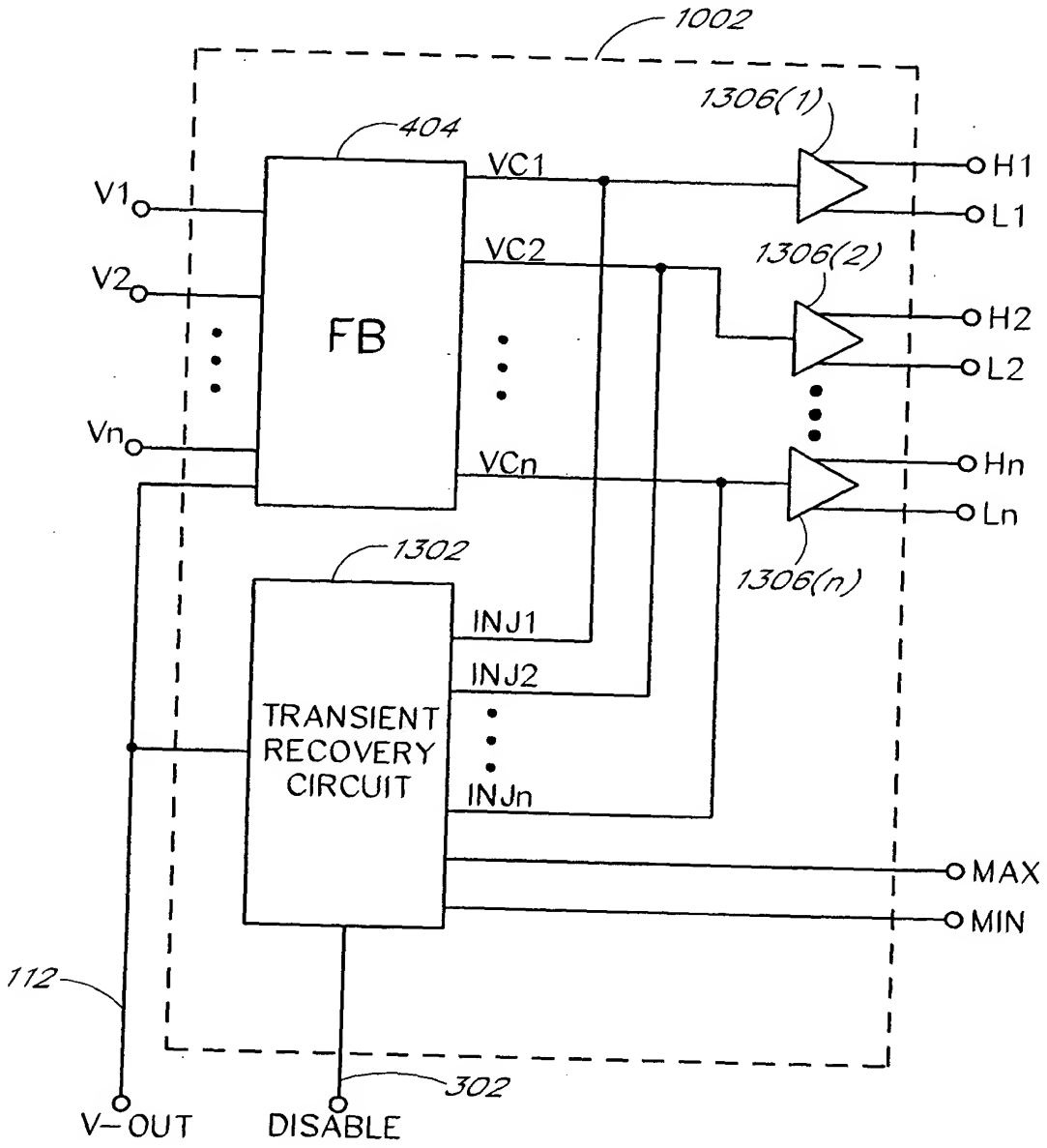
1002
1306(1)
404
VC1
V1
H1
L1
VC2
1306(2)
V2
FB
H2
L2
Vn
VCn
Hn
Ln
1302
1306(n)
INJ1
INJ2
TRANSIENT
RECOVERY
CIRCUIT
INJn
MAX
MIN
112
302
V–OUT
DISABLE

FIG. 13

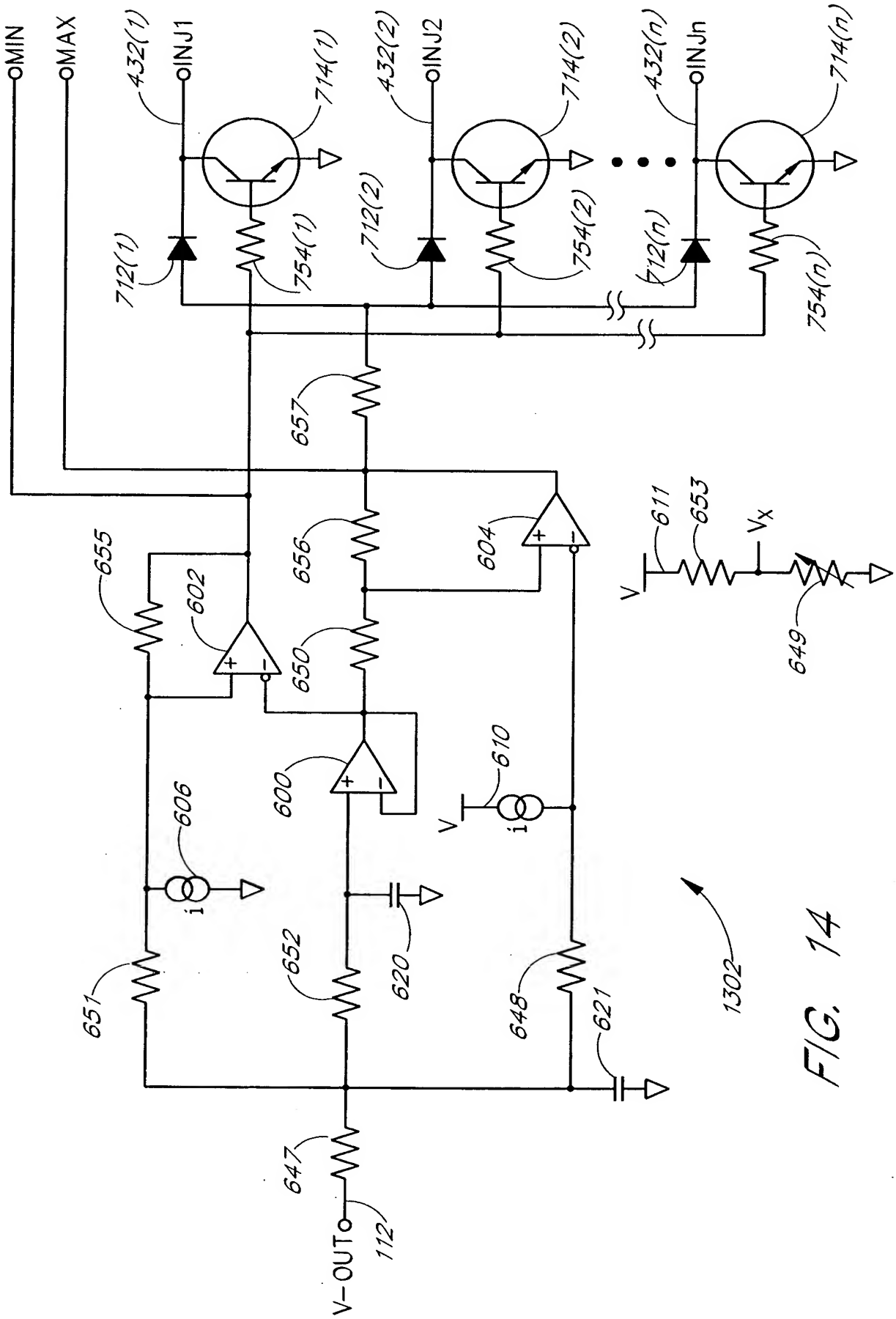
MIN
MAX
INJ1
INJ2
INJn
432(1)
432(2)
432(n)
714(1)
714(2)
714(n)
712(1)
712(2)
712(n)
754(1)
754(2)
754(n)
657
656
655
650
651
652
648
647
620
621
649
653
611
600
602
604
606
610
1302
V-OUT
112

FIG. 14